



Faculty of Economic Sciences, Communication and IT
Computer Science

Syllabus

Course Approval

The syllabus was approved by the Faculty Board of Economic Sciences, Communication and IT on 6 May 2009, and is valid from the Autumn semester of 2007 at Karlstad University.

Course Code: DVGB03

Data Structures and Algorithms, 7.5 ECTS Credits

(Datastrukturer och algoritmer, 7.5 Swedish credit points)

Degree Level: Bachelor

Progression Level: B

Language of Instruction

Swedish and English

Prerequisites

30 credits in Computer Science, including 7,5 hp in basic programming.

Major Field of Study

Computer Science

Learning Outcomes

Upon completion of the course, the students should be able to:

- give an account of the role of abstraction in software development and computer science,
- give an account of abstract data structures and their role in software development,
- give an account of the algorithms common in the field of computer science,
- give an account of the concepts behind the theory of complexity,
- combine and use abstract data structures as a general purpose design tool,
- apply the algorithms commonly occurring in computer science,
- apply the theory of complexity on simple algorithms and programmes, and
- write lab reports.

Content and Form of Instruction

The course covers basic data structures (sequence, list, stack, queue, tree, graph) and related applications.

The course covers a number of algorithms using the above-mentioned data structures: sorting, searching, hashing, and navigating within certain data structures, finding the shortest way between two nodes in a graph, finding the shortest way in a tree structure, detection of cycles, minimum spanning trees, strong components and spanning forests. The students will also be introduced to the concept of heuristics.

In addition, the course will evaluate algorithms and basic complexity theory.

The course includes both theory and practice. Instruction is in the form of lectures and independent study

(theory) as well as exercises and group laboratory sessions (practice).

Reading List

See separate document.

Examination

Examination is in the form of laboratory assignments, take-home assignments, and a final written exam.

Grades

One of the grades 5 (Pass with Distinction), 4 (Pass with Merit), 3 (Pass), and U (Fail) is awarded in the examination of the course.

Quality Assurance

Follow-up relating to learning conditions and goal-fulfilment takes place both during and upon completion of the course in order to ensure continuous improvement. Course assessment is based on student views and experiences as reported in written course evaluations and/or group discussions. Students will be informed of the result of the evaluation and of the measures to be taken.

Course Certificate

A course certificate will be provided upon request.

Additional Information

Students who enrolled before 1 July 2007 will complete their studies in accordance with the requirements of the earlier admission. Upon completion students may request degree and course certificates to be issued under the current ordinance if they meet its requirements.

The local regulations for studies at the Bachelor's and Master's levels at Karlstad University, ref. C2007/368, stipulate the obligations and rights of students and staff.

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